AMENDMENTS

In the specification:

Page 1, delete line 1 as follows:

~~**DESCRIPTION**~~

Page 1, before line 5, insert the following:

REFERENCE TO RELATED APPLICATIONS

This application is a national stage application under 35 USC 371 of International Application No. PCT/JP2004/000816, filed January 29, 2004, which claims priority from Japanese patent application No. 2003-432986, filed December 26, 2003, the disclosures of which are incorporated herein by reference.

Page 1, line 5, amend the heading as follows:

~~Technical~~ Field of the Invention

Page 1, line 11, amend the heading as follows:

Background [[Art]] of the Invention

Page 2, amend the paragraph beginning at line 13 as follows:

Japanese Patent Application Publication No. 2003-111,848 discloses the technique in which heating liquid filled in the balloon is stirred by utilizing vibration in order to uniform the temperature of the heating liquid in the balloon. More specifically, the device of this type is ~~constructured~~ constructed in such a manner that a vibration imparting device for imparting vibration is connected to the base end portion of a catheter main body and a passage extending from the

vibration imparting device to the balloon is filled with the heating liquid so as to transmit the vibration imparted with the vibration imparting device to the heating liquid in the balloon through the heating liquid within the catheter main body.

Page 3, line 19, insert the following:

Summary of the Invention

A heating-type balloon catheter device is provided. The catheter device may include a heating-type balloon at a top end portion of a catheter main body and a vibration imparting device connected to a base end portion of the catheter main body. The vibration imparting device may impart vibration to a liquid for heating in the heating-type balloon and include an elastic tube with a base end portion connected to the catheter main body and with a top end portion thereof closed. The elastic tube may be filled with a liquid for heating. A vibrator device having a roller rotating about a rotary shaft at a position offset to the rotary shaft may be provided. The elastic tube may be set to such a vibrator device so that a predetermined direction of rotation of the roller extends from the side of the base end portion of the elastic tube to the side of the top end portion thereof and a margin volume part which is not pressed with the roller is provided on the side of the top end portion of the elastic tube.

Brief Description of the Drawings

Fig. 1 is a system diagram showing an example of the present invention.

Fig. 2 is a side view in section showing an essential portion of the case where the orifice of the pulmonary vein is cauterized.

Fig. 3 is a view in section taken along the line 3-3 of Fig. 2.

Fig. 4 is a plan view in partial section showing the detail of the vibrator device with the elastic tube set thereto.

Detailed Description of the Invention

Page 3, amend the paragraph beginning at lines 19 and 25 as follows:

The present invention ~~has been completed with the above situation taken into account and~~ has the first object to provide a heating-type balloon catheter device that can provide a balloon with vibration having the magnitude appropriate for the size of the balloon and that can thoroughly block a vibration site to which to impart vibration and a contact site to be brought into contact with a heating liquid.

The second object of the present invention is to provide an elastic tube device for use with the ~~heaing-type~~ heating-type balloon catheter device of the present invention.

Page 4, line 3, amend the heading as follows:

~~**Disclosure of the Invention**~~

Page 4, amend the subparagraph beginning at line 26 as follows:

wherein the elastic tube is structured to assume a ~~shutt-off~~ shut-off state and a communication state in accordance with rotation of the roller in the predetermined direction of rotation thereof in such a way that the ~~shutt-off~~ shut-off state is set to a state in which the base end portion of the elastic tube and the top end portion thereof are blocked by constriction or decrease of a radial size of the elastic tube by pressing the elastic tube with the roller in the predetermined direction of rotation, and the communication state is set to a state in which the base end portion thereof is communicated with the top end portion thereof by expansion or increase of the reduced radial size of the elastic tube due to elasticity of the elastic tube by releasing the pressing of the roller upon the elastic tube; and

Page 5, amend the subparagraph beginning at line 8 as follows:

wherein, in accordance with the rotation of the roller in the predetermined direction of rotation thereof, pressure is applied to the heating liquid in the elastic tube toward the margin volume part, one the one hand, during a period when the elastic tube is in the ~~shutt-off~~ shut-off state, and the heating liquid to which pressure is applied in the margin volume part is flown backward toward the base end portion of the elastic tube, on the other hand, during a period when the elastic tube is in the communication state.

Page 5, amend the paragraph beginning at line 16 as follows:

In accordance with the above solution, the heating liquid is provided with pressure toward the margin volume part, on the one hand, by pressing the elastic tube with the roller, that is, by constricting or ~~ecreasing~~ decreasing the radial size of the elastic tube, and the pressured heating liquid within the margin volume part is allowed to flow backward toward the catheter main body side, i.e., the balloon side, on the other hand, by separating the roller apart from the elastic tube, that is, expanding or increasing the radial size of the elastic tube. The application of pressure and the backward flow of the heating liquid may be performed at repeated times in accordance with the rotation of the rotary shaft. In the event where a larger-sized balloon is to be applied, the way of setting the elastic tube to the roller-type vibrator device is changed simply in such a manner that the margin volume part becomes larger than the balloon being smaller in size. In other words, in the event that the balloon is a larger one, the elastic tube can be set to the roller-type vibrator device in such a manner that the margin volume part becomes larger in volume while the balloon is smaller in size. This setting permits an appropriate level of vibration energy to be obtained in accordance with the size of the balloon. It is further noted as a matter of course that the cycle of vibration can be readily varied with the number of rotation of the rotary shaft.

Page 6, amend the paragraphs beginning at lines 10 and 16 as follows:

In addition, as the vibrator device of the present invention is of the type utilizing the rotary movement alone, the vibrator ~~devive~~ device can be made simpler in structure than the conventional one that utilizes the reciprocal movement. Furthermore, the vibrator device according to the present invention can be structured by using a conventional roller pump in an efficient way.

The preferred embodiments on the premise of the above-mentioned solutions are as described in claims 2 to 10. More specifically, the elastic tube is connected to a base end portion of the catheter main body through an extension tube which is superior in rigidity and unlikely to be deformed by expanding or constricting in a radial direction thereof (as described in claim 2). In this embodiment, the vibrator device can be fitted at a position apart from the catheter main body. It is to be noted herein as a matter of course that, as the extension tube is made of a material unlikely to be deformed by ~~expandubg~~ expanding or constricting, the vibration is not caused to be damped at the extension tube portion to a great extent.

Page 7, amend the paragraphs beginning at lines 3 and 12 as follows:

The [[the]] elastic tube is connected to the predetermined branch passage through a shift valve that can assume a first shift position and a second shift position, the first shift position being structured to block the communication of the elastic tube with the catheter main body in order to supply the catheter main body with the contrast agent and the second shift position being structured to communicate the elastic tube with the catheter main body (as described in claim 4). In this embodiment, the shift valve can easily shift the position from a state of supplying the contrast agent to a state of imparting vibration and vice ~~cersa~~ versa.

The elastic tube can be provided at an outer ~~peripherical~~ peripheral surface thereof with an indicator indicating the size of the margin volume part to be set in accordance with the size of the balloon (as described in claim 5). In this embodiment, the indicator allows an easy and optimum setting of the size of the margin volume part in accordance with the size of the balloon.

Page 9, amend the paragraph beginning at line 26 as follows:

In a further preferred embodiment, the elastic tube can be provided with the air vent valves at each of the edge and the base end portions thereof in order to enable a selective ~~ventillation~~ ventilation of the air present in the elastic tube (as described in claim 14). This preferred embodiment can provide the elastic tube device capable of venting the air from the path extending from the balloon to the top end of the elastic tube.

Page 11, amend the paragraph beginning at line 1 as follows:

Another preferred embodiment can comprise two rollers disposed each at an interval of 180 degree round the rotary shaft and the guide surface set each at an angle in the range of approximately 60 degree round the rotary shaft (as described in claim 17). In this embodiment, the ~~appliation~~ application of pressure and the backward flowing can be conducted each two times per one full revolution of the rotary shaft. This preferred embodiment can set the time for applying pressure for the first time and the time for ~~flowingbackward~~ flowing backward for the first time as well as the time for applying pressure for the second time and the time for flowing backward for the second time per one full revolution to be substantially equal to each other.

Page 12, lines 14-23, amend as follows:

~~**Brief Description of Accompanying Drawings**~~

~~Fig. 1 is a system diagram showing an example of the present invention.~~

~~Fig. 2 is a side view in section showing an essential portion of the case where the orifice of the pulmonary vein is cauterized.~~

~~Fig. 3 is a view in section taken along the line 3-3 of Fig. 2.~~

~~Fig. 4 is a plan view in partial section showing the detail of the vibrator device with the elastic tube set thereto.~~

~~**Best Modes for carrying out the Invention**~~ **Exemplary Embodiments**

Page 14, amend the paragraph beginning at line 6 as follows:

As shown again in Fig. 1, the base end portion of the catheter main body 1, i.e., the portion disposed outside the body, is connected to a connecter 20. The connecter 20 comprises a main passage 21, a first branch passage 22 and a second branch passage 23, the main passage 21 extending on a plane approximately with the catheter main body 1 in the axial direction as well as the first branch passage and the second branch passage each being branched from the main passage 21. The second branch passage 23 is further branched into two branch ~~passageg~~ passages 23a and 23b.

Replace the Abstract of the Disclosure with the abstract attached in the Appendix.